

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A semiconductor laser element comprising
a substrate,
a plurality of semiconductor layers, including at least an active layer, formed on the substrate, and
a first concave portion formed on one surface of the substrate, said one surface being opposite to the other surface having the semiconductor layers formed thereon, wherein
the first concave portion is filled with a metal having a heat conductivity higher than the substrate, and wherein
the depth of the first concave portion is at least equal to the thickness of the substrate.
2. (currently amended): A semiconductor laser element comprising
a substrate,
a plurality of semiconductor layers formed on the substrate, and
a first concave portion formed on at least a part of one surface of the semiconductor layer, said one surface being the surface further from the substrate, wherein
the first concave portion is filled with a metal having a heat conductivity higher than the semiconductor layer.

3. (previously presented): The semiconductor laser element according to claim 2, wherein a second concave portion is formed on one surface of the substrate, said one surface being opposite to the other surface having the semiconductor layers formed thereon, and wherein said second concave portion is filled with a metal having a heat conductivity higher than the substrate.

4. (currently amended): The semiconductor laser element according to any of claims 1 to 3, wherein the first concave portion has a reverse mesa form in a direction vertical to a light-emitting face.

5. (previously presented): The semiconductor laser element according to any of claims 1 to 3, wherein a heatsink is connected to the metal filled in the first concave portion.

6. (original): The semiconductor laser element according to any of claims 1 to 3, wherein a plurality of light-emitting portions are formed on the semiconductor layer to form a semiconductor laser array.

7. (previously presented): The semiconductor laser element according to any of claims 1 to 3, wherein said semiconductor laser element is a light source for exciting a solid laser.

8. (cancelled):

9. (cancelled):

10. (cancelled):

11. (cancelled):

12. (cancelled):

13. (cancelled):

14. (cancelled):

15. (cancelled):

16. (cancelled):

17. (cancelled):

18. (cancelled):

19. (cancelled):

20. (currently amended): ~~The A semiconductor laser element according to claim 18 or 19, comprising:~~

a GaN substrate equipped with one of a pair of electrodes,
a semiconductor layer made of a GaN-base semiconductor including at least an active
layer, said semiconductor layer disposed on the GaN substrate, and
the other one of the pair of electrodes disposed on the semiconductor layer, and
an electric current injection region formed on the semiconductor layer, wherein
a groove is formed on one surface of the GaN substrate at a region thereon corresponding
to the electric current injecting region, said one surface being the surface further from the
semiconductor layer, said groove reaching to the depth of the semiconductor layer, and wherein
said one of the pair of electrodes is formed on the surface of the groove,
wherein a contact layer is formed on the GaN substrate side of the semiconductor layer,
wherein the contact layer is ohmic-connected to the electrode formed on the surface of
the groove,

wherein the groove is filled with a metal having a heat conductivity higher than the GaN substrate,

wherein the surface having the groove is flattened, and wherein,

AMENDMENT UNDER 37 C.F.R. § 1.111
U. S. Application No. 09/826,851

a heatsink is connected to the flattened surface.

21. (original): The semiconductor laser element according to claim 20 wherein the metal is Au.

22. (cancelled):

23. (currently amended): A semiconductor laser element comprising
a substrate,

a plurality of semiconductor layers, including at least an active layer, formed on the substrate, and

a groove formed on one surface of the substrate, said one surface being opposite to the other surface having the semiconductor layers formed thereon, wherein

the groove extends to the depth of the substrate, and wherein

the groove is filled with a metal having a heat conductivity higher than the substrate.